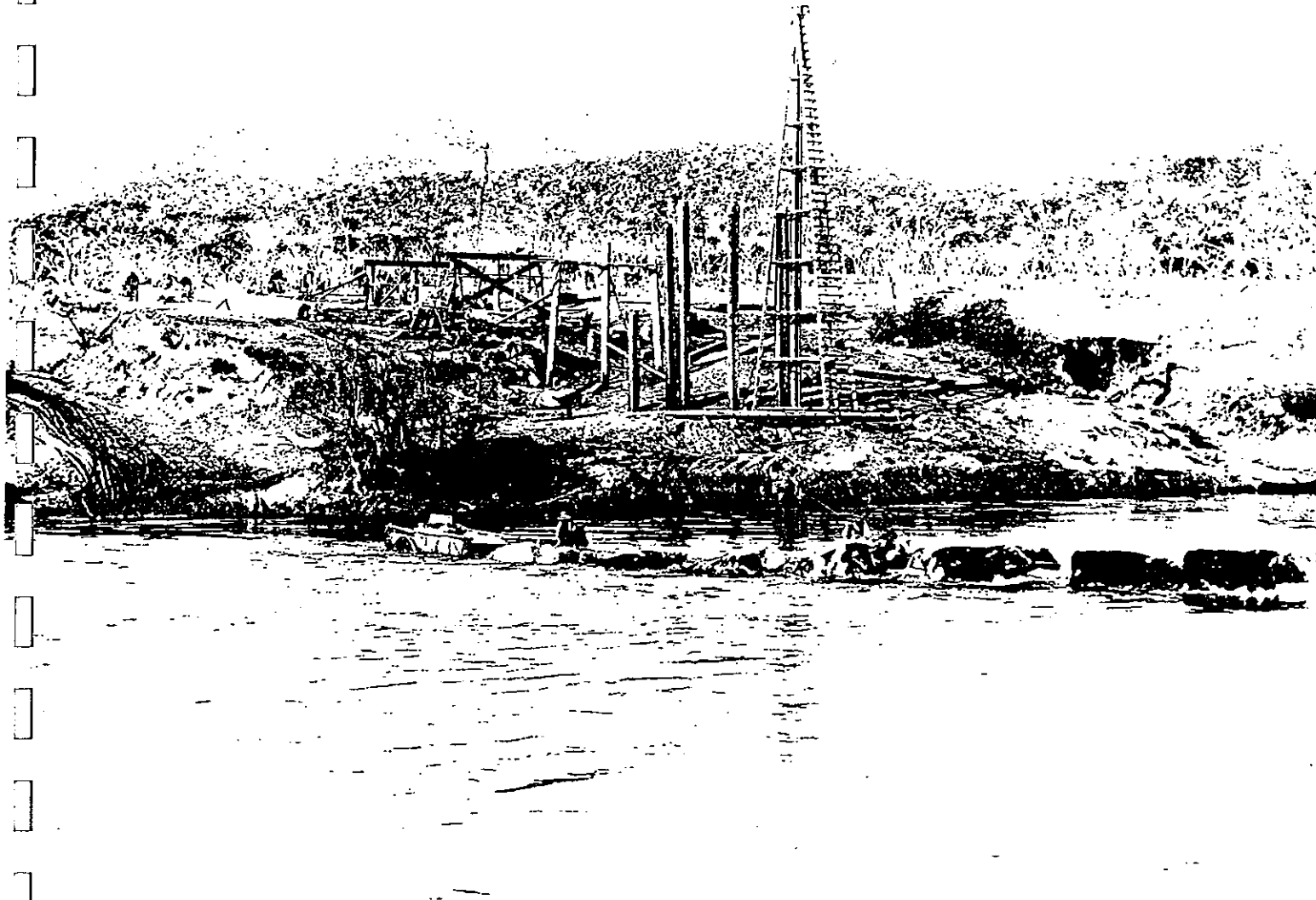


NOMINATION FOR HISTORIC ENGINEERING MARKER
THARWA BRIDGE OVER MURRUMBIDGEE RIVER
IN THE AUSTRALIAN CAPITAL TERRITORY



BRIDGE UNDER CONSTRUCTION - 1894

Commemorative Plaque Nomination Form

Date 24 November 1994

To :

Commemorative Plaque Sub-Committee

From ... Heritage Panel

~~of Local Division office of the Institution~~
~~and its Heritage Committee/Panel~~

... Canberra Division

The Institution of Engineers,
Nominating Body Australia.

The following work is nominated for a :-

- * ~~National Engineering Landmark~~
- * Historic Engineering Marker
- *(delete as appropriate)

Name of work ... THARWA BRIDGE OVER MURRUMBIDGEE RIVER IN A.C.T.

Location, including address, and map grid reference if a fixed work approximately 33km, south of ...
Canberra, adjacent to village of Tharwa, A.C.T.

A.C.T. Standard Grid map reference ... 578650N 205400E

Owner ... A.C.T. DEPARTMENT OF URBAN SERVICES -

TRAFFIC AND ROADS SECTION OF ROADS AND TRANSPORT BRANCH

The owner has been advised of the nomination of the work and has indicated

(attach copy of letter if available) supports nomination - copy of letter attached, dated

20 September 1994.


Access to site ... By road - bridge is in service.

Future care and maintenance of the work will be continued by owner-department, being part of
A.C.T. roads/bridges system - expected that life of bridge will be indefinite.

Name of sponsor

For a NEL, is an information plaque required ? ... N.A.

Chairperson of Nominating Committee


Chairperson of Division Heritage Committee/Panel

ADDITIONAL SUPPORTING INFORMATION

Name of work . . . THARWA BRIDGE

Year of construction or manufacture . . 1895

Period of operation . . Truss spans have been used continuously, since opening (99 years)

Physical condition . Sound - in operational condition.

Engineering Heritage Significance :-

Technological/scientific value } Oldest surviving Allan timber truss bridge, demonstrating

Historical value } . . . innovative design for Australian conditions in late 19th
century.

Social value . Major impact on district communities when constructed - local community
strongly identifies with bridge and supports its retention.

Landscape or townscape value . Integral part of open landscape on north east of village.

Rarity . Oldest survivor of approximately 100 Allan truss bridges built between 1893-1927

Representativeness . Well maintained/restored example of "short" (27.5m) Allan trusses -
original beam approach spans replaced 49 years ago with then standard concrete & steel

Contribution to the nation or region . Provided permanent access south and west of upper
Murrumbidgee and connection with rail system to Sydney.

Contribution to engineering . Success of Allan's design for Australian conditions, using local
products, led to construction of approximately 100 similar bridges.

Persons associated with the work . Designer - Percy Allan, NSW Public Works
Contractor - Christopher McClure

Integrity } Original 8 Allen trusses (4 spans) have been retained, progressively restored.

Authenticity } Original timber piles are retained below ground, concrete encased above ground
(1935). Original timber beam approach spans were replaced with steel and
concrete (1945)

Comparable works (a) in Australia . . . See 'Rarity' above - several later Allan truss bridges
are still in service.

(b) overseas . . . None recorded.

Statement of significance, its location in the supporting documentation . See attached submission.

Citation (70 words is optimum) . . . See attached submission.

Attachments to the submission (if any) . Detailed submission, with copies of 1895 plans and
photographs.

Location of plaque (if not at site) . . On site - to be determined in consultation with owner.

**SUBMISSION OF NOMINATION FOR
HISTORIC ENGINEERING MARKER**

THARWA BRIDGE OVER MURRUMBIDGEE RIVER IN A.C.T.

1. INTRODUCTION
2. NOMINATION DETAILS AND LOCATION MAP (FIGURE 1)
3. STATEMENT OF SIGNIFICANCE
4. EXTENT OF DEVELOPMENT IN 1890'S
5. BRIEF LOCAL HISTORY
6. ENGINEERING HERITAGE SIGNIFICANCE
7. DETAILS OF THE BRIDGE, ITS CONDITION AND INTEGRITY
8. SOCIAL AND LANDSCAPE VALUES
9. DRAWINGS
10. PHOTOGRAPHS
11. REFERENCES
12. DRAFT CITATION

ATTACHMENTS:

BOOKLET "BRIDGE OVER THE MURRUMBIDGEE RIVER AT THARWA, A.C.T." Published by Bridges and Structures Unit of A.C.T. Department of Urban Services.

TIMBER BRIDGES OF NEW SOUTH WALES
by D.J. Fraser - published 1985 by The Institution of Engineers, Australia.

EXTRACT FROM "TIMBER TRUSS BRIDGE MAINTENANCE HANDBOOK"
Published by NSW Dept. of Main Roads 1987.

CORRESPONDENCE WITH BRIDGE OWNER - approval to submit for historic engineering marker.

NOMINATION OF THARWA BRIDGE FOR HISTORICAL ENGINEERING MARKER

1. INTRODUCTION

This submission is made to the Commemorative Plaque Sub-Committee of the Institution's National Committee on Engineering Heritage by the Engineering Heritage Panel of Canberra Division. It proposes recognition by the National Committee, and placing of a Historic Engineering Marker on the Tharwa Bridge, on or about the occasion of the centenary of its opening on 27 March 1895.

2. NOMINATION DETAILS

The bridge known as "Tharwa Bridge" is nominated for a Historic Engineering Marker. The bridge is operational, and owned by the ACT Government (Department of Urban Services) having been built by contract for the NSW Public Works Department in 1894/5, and subsequently become part of works within the Australian Capital Territory.

It is located approximately 33 kms south of Canberra, over Murrumbidgee River adjacent to the village of Tharwa - see attached Figure 1 showing Bridge Site within Australian Capital Territory.

Major modifications to piers (1936) and approach spans (1945) have, with time, achieved status of part of the bridge. However this nomination is focussed on the four "Allan" truss spans of the Bridge, immediately over the stream. These trusses are the main surviving authentic sections of the original bridge, and are the oldest examples in service of an innovative and cost-effective design for Australian conditions prepared by Percy Allan, born Sydney 1861.

3. STATEMENT OF SIGNIFICANCE

The bridge is a direct and continuing connection with technical, commercial and social environments in Australia 100 years ago, in the decade before federation of colonies into one nation. It is the oldest bridge in the A.C.T., and the four central spans are the oldest surviving examples in service of an innovative timber truss designed by Australian born engineer Percy Allan - more than 100 bridges of this type were built in the next 35 years.

In a period marked by financial difficulties in the emerging nation, Allan's truss design demonstrated the ability of Australian engineers to research and develop up-to-date and cost effective technology specific to Australian materials, workers skills and construction methods.

Allan's truss designs used newly published (1893) structural data on Australian hardwood timbers by Professor Warren of Sydney University. Warren's data,

applied by sound analytical methods, allowed Australian hardwoods to be used efficiently in major bridge construction. Allan's designs modified the American Howe truss to provide a standard (90 feet = 27.5 metres) pony truss as at Tharwa, and a longer (110 feet = 33.6 metres) overhead braced truss.

Tharwa is one of the earliest "Allan truss" structures - possibly the fourth completed. Its construction in 1894/95 followed immediately after publication in 1893 of Warren's test results.

Use of timber as the principal material - in this case NSW North Coast hardwoods - reflected a policy to reduce imports, and to use local labour. Timber workers were more available inland than stone masons or bricklayers, with cost advantages for construction and later maintenance.

Construction of the bridge followed forty years of political pressure - over that time agricultural and grazing development expanded in the region, and Government railway extended to nearby Michelago in 1887 with increasing need to move sheep and wool across the Murrumbidgee and to give access to the Monaro region to the south, including the goldfields at Kiandra.

Contemporary local significance of the bridge and the extent of settlement in the area can be gauged from newspaper reports of the opening ceremony. Report of 30 March 1895 in "The Queanbeyan Age" newspaper stated that approximately 1000 people were in attendance, with band and local military unit. This report also provides an interesting comment on rural society of the time.

During 1994 the A.C.T. Government Department of Urban Services undertook timber replacement and restoration of some metal sections. The life of the bridge can be extended indefinitely, and this effectively meets the Tharwa community view that the bridge gives a distinctive quality to the locality, as well as direct access at the village.

4. EXTENT OF DEVELOPMENT IN 1890'S

The 1890's decade saw rapid economic and political development in Australia, despite major banking failures (mainly in Victoria).

The size and relativities of urban and rural populations may be seen from a census conducted in New South Wales in 1891 - it provides some insight into restraints on development due to the then unbridged upper Murrumbidgee. In N.S.W. there were 141 counties (a term applied to each district, and used in the land title system to define a locality).

At Tharwa, the river divided the counties of Murray (on Queanbeyan side) and Cowley (on the west side extending towards the Monaro and Kiandra areas).

The 1891 census showed County of Murray as ranking (by population) 22 in 141 - its population of 9213 included 4073 urban people. However, County of Cowley,

across the river, ranked 99 in 141 in the colony, and its population of 683 was entirely rural - no urban settlement.

At that census total population of N.S.W. was counted as 1,140,500, including 8,300 aboriginal people.

5. BRIEF LOCAL HISTORY

In the late 19th century Tharwa district was a well established (approximately 50 years) agricultural community, with several large grazing properties, centred on the town of Queanbeyan. The Murrumbidgee River dividing the district (see para 4 above) restricted transport of stock and produce and access to lands in Monaro region and Kiandra goldfields. Community pressure and favourable responses by State parliamentary members led to authorisation of a major bridge, to be built for N.S.W. Public Works Department. Tenders closed in March 1894, and contract was awarded to Christopher McClure for £4,469.14.10.

Bridge timber was procured from North Coast of N.S.W., and with other materials was railed to "Tuggeranong" siding, the railway from Sydney and Goulburn having extended south to Michelago on the east side of the river, in 1887.

Although local road conditions between the railway siding and the bridge site caused delays, the project was completed ahead of time. Final cost was £4,858.

The public opening held on 27 March 1895, attended by State and local representatives, and more than 1000 people, was reported in detail in "The Queanbeyan Age" newspaper of March 30, 1895. Records prepared by the Tharwa School also note that "Queen Nellie Hamilton, the last surviving tribal aboriginal in the local area (she died in 1897) was an honoured guest at the opening and all the school children were presented to and shook hands with her".

6. ENGINEERING HERITAGE SIGNIFICANCE

As development spread inland in New South Wales in the 19th century, pressure for transport connections by railways and roads increased, and emphasis was placed on efficient and economical designs which utilised Australian local products. A paper by Dr D.J. Fraser "Timber Bridges of New South Wales" published by The Institution of Engineers, Australia in 1985 gives a comprehensive history of timber bridge development in the second half of the 19th century, including the significance and technical advantages of the timber truss designed as a modification of the American Howe truss by Percy Allan (later Engineer-in-Chief of Bridge Design) of N.S.W. Public Works Department. The N.S.W. Department of Main Roads "Timber Truss Bridge Maintenance Handbook" (1987) also sets out design features - see copy attached.

Results of tests conducted by Professor Warren of Sydney University on local and hardwood timbers (and some imported timbers) were published in 1893.

D.J. Fraser notes that Allan combined these results with improved design methods to the American truss technology he introduced in 1983. x

Drawings of the Tharwa Bridge details (held by the Bridge and Structures Unit of A.C.T. Department of Urban Services, and copies included in the Unit's publication attached to this submission) include Allan's signature, under date of 6/2/94.

In view of the Warren test publications a few months previous to 1894, and the almost immediate construction of several Allan truss structures in 1894, 1895 and 1896 - D.J. Fraser's records list 17 constructed over those three years, all except Hampden Bridge at Wagga Wagga using 90 foot span trusses - the development and use of the Allan truss marks a major point in bridge design and application of engineering technology appropriate to Australian conditions, material and workmanship.

None of the 1894 Allans remain, and only two of the 1895 structures - Tharwa opened 3.95 and Hampden Bridge at Wagga Wagga, opened 11.95. As noted above, they are of different length trusses, and therefore Tharwa is proposed as the oldest example of both the short standard (90 feet) truss and of all Allan truss bridges.

It is worth noting that 5 of the 1896 Allans are still extant - so a total of 7 of the original 17 built in the first three years have survived for a century - and this 40% survival rate is a commendation of the Allan design. 112 bays - Fraser

7. DETAILS OF THE BRIDGE, ITS CONDITION AND INTEGRITY

The structure was designed as 4 central timber trusses ^{span} (each of length 90 feet = 27.5 metres) and seven timber beam spans. Spans on Queanbeyan (Canberra) approach were 1 x 30' and 3 x 35' (= 1 x 9.0m, 3 x 10.5m) and on Tharwa side were 1 x 30' and 2 x 35'. Clearance above low stream flow is approximately 12 metres, and, at the time of opening, it was reported as 1 1/2 metres above high flood. Width between kerbs is 15 feet (= 4.5 metres). Foundations were long timber piles driven about 20 feet (= 6 metres) into bouldery gravel, with extensive timber bracing on all ten (10) piers. Approach embankments, mainly on the Queanbeyan side, total approximately 200 metres. x
✓
1908 bridge
the 2nd

The Press Report of the opening stated "the trusses are of the new pattern recently designed under the direction of the Commissioner and Engineer-in-Chief for roads and bridges" - an indication of contemporary awareness of the new Allan design.

The attached publication by Bridges and Structures Unit of A.C.T. Department of Urban Services sets out the record of major maintenance and restoration work on the bridge. ✓
Construction

As noted in that publication, the original piles survive, but the timber piers were encased in concrete in 1936, and the timber beam approach spans were replaced (with steel and concrete) in 1945.

However, the four 90' (27.5m) Allan trusses are essentially intact with much of their original timbers, and are the main subject of this submission.

The recent renovations undertaken by A.C.T. Department of Urban Services (outlined in booklet "Bridge over Murrumbidgee River at Tharwa - copy attached) have restored 4 of the 8 Allan Trusses to the original Allan design, which had been slightly modified by previous maintenance and repair works. The two most notable restorations involved replacing metal round "pipe" sections used as side-bracing to the truss top chords with T sections as shown in Allan's original drawings, and metal-splice plates used at the time of original construction.

It is intended that the other 4 trusses will be similarly treated in a later budget program.

8. SOCIAL AND LANDSCAPE VALUES

Existence of the bridge and its retention in the face of several suggestions in recent years that it be replaced with a structure elsewhere over the river has been an issue of great importance to local residents. Community surveys have indicated a strong sense of local identity with the structure, as well as reliance on it for road access.

The early history of the district and bridge has been recorded through efforts of the local Primary School authorities. Properties at the time of building the bridge still have their local presence, viz - Cuppacumbalong (adjacent to Tharwa Village), Lambrigg (where William Farrer conducted research on wheats to obtain varieties that withstood Australian conditions) and Lanyon (now overtaken by Canberra urban growth) and Booroomba - where Mrs McKeahnie, who opened the bridge, was resident at that time.

The bridge site is on a relatively open flood plain of the Murrumbidgee, with backdrop of mountains to south and southeast. It is integrated with this landscape, and the immediately adjacent Tharwa village, to form a pleasing example of how nature and technology can be evidently compatible, over a long period of settlement and local agriculture.

The wide heritage significance of the bridge has been recognized by the National Trust of Australia (ACT) - classified in 1980, and it was entered in the Register of the National Estate in 1983, and is included (under recent ACT legislation) in the ACT Heritage Register.

9. SCHEDULE OF DRAWINGS

FIGURE 1 SOUTHERN A.C.T. SHOWING THARWA BRIDGE SITE
(Courtesy A.C.T. Department of Urban Services)

FIGURE 2 BRIDGE ELEVATION - 1895 and 1990
(Courtesy Maunsell Pty Ltd)

FIGURE 3 DETAILS OF 90 FT TIMBER TRUSS SPAN
(Copy from N.S.W. Public Works Department plan)

FIGURE 4 BRIDGE OVER MURRUMBIDGEE AT THARWA
(Copy from N.S.W. Public Works Department plan)

Note: Figures 3 and 4 are incorporated in the attached booklet "Bridge over the Murrumbidgee River at Tharwa" - provided by courtesy ACT Department of Urban Services.

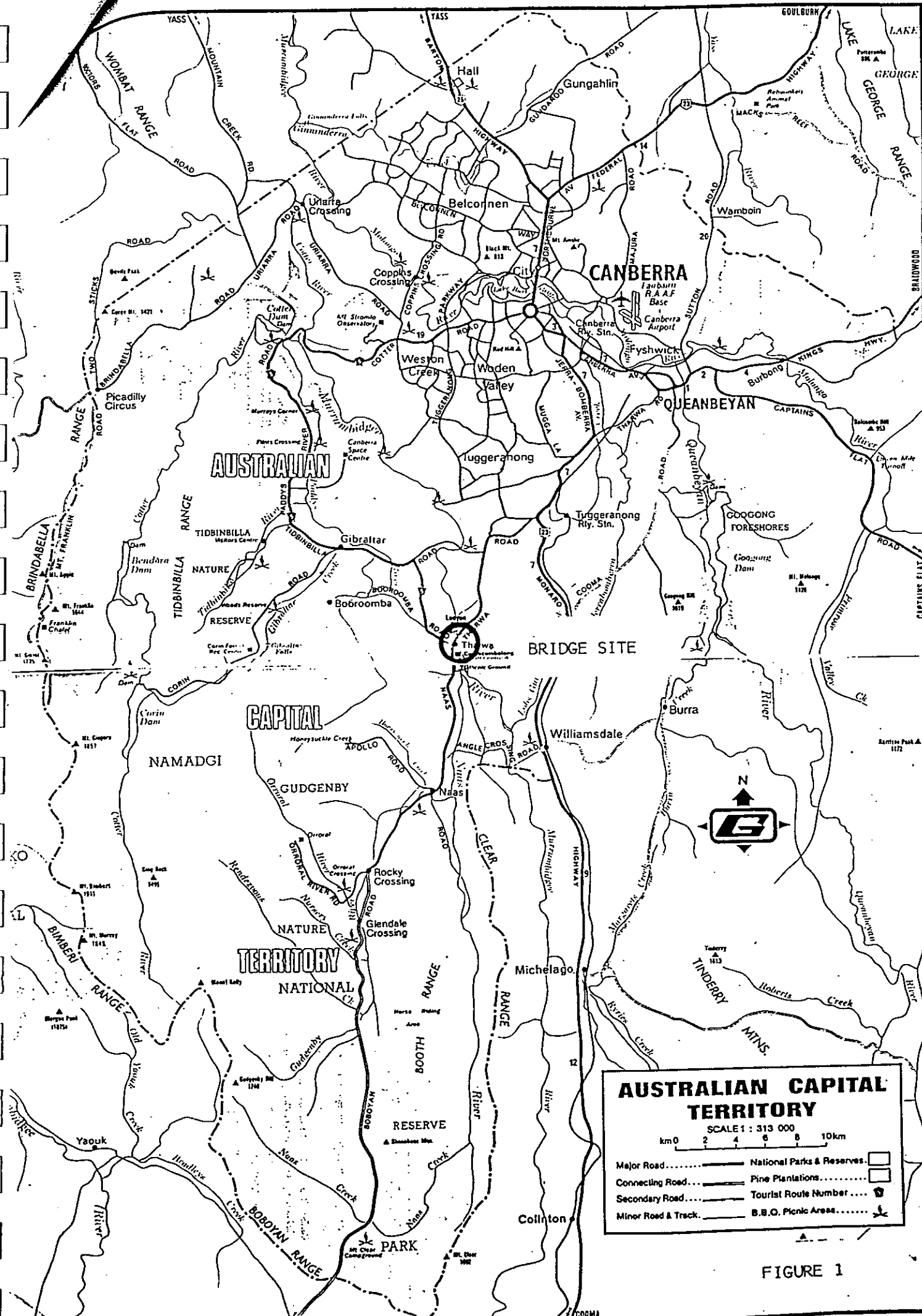


FIGURE 1